United States
Department
of Agriculture

Forest Service

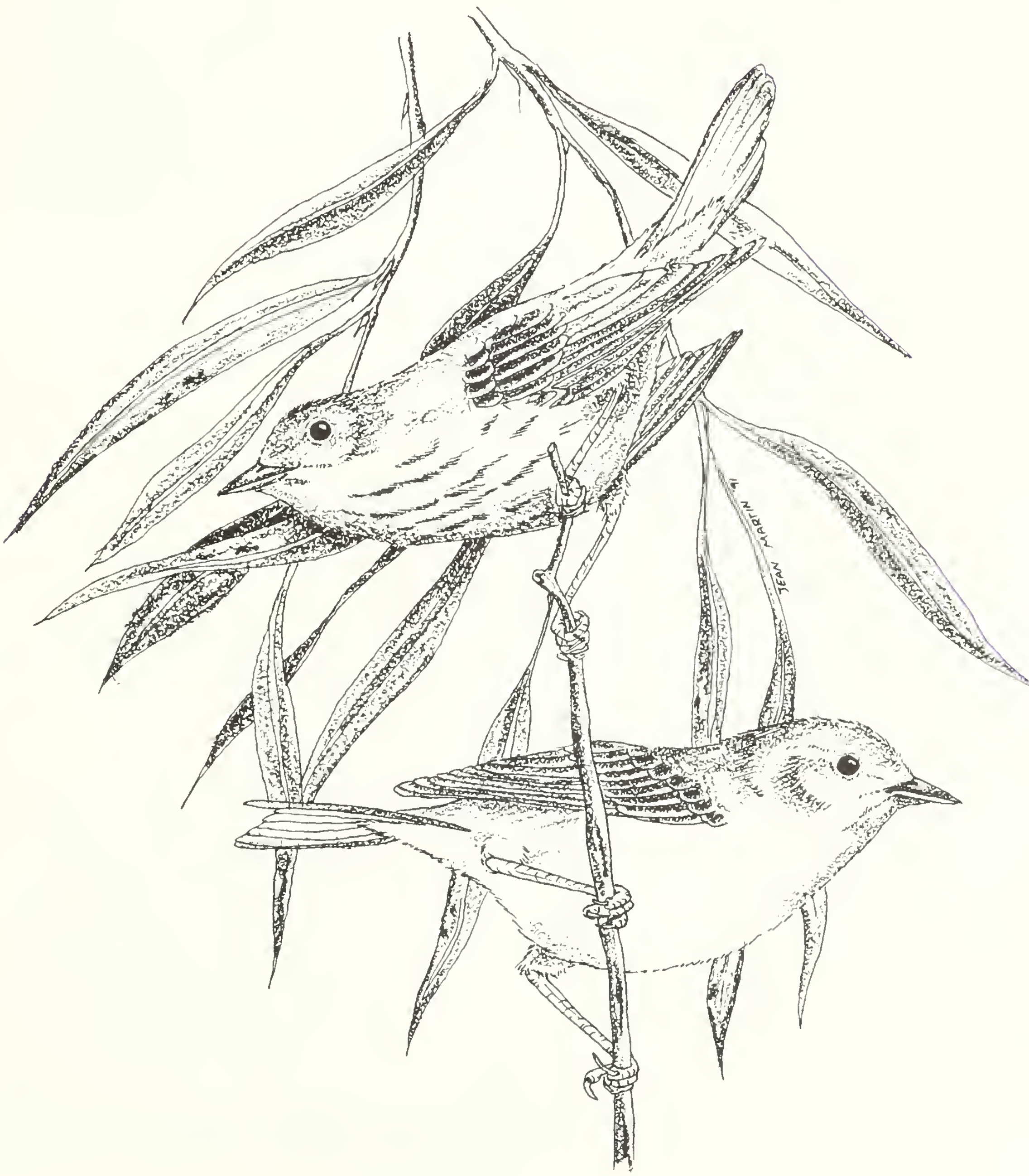
**Intermountain
Research Station**

Research Paper
INT-441

April 1991

Breeding Bird Populations in a Grazed and Ungrazed Riparian Habitat in Nevada

Dean E. Medin
Warren P. Clary



THE AUTHORS

DEAN E. MEDIN is a research wildlife biologist with the Intermountain Research Station at the Forestry Sciences Laboratory in Boise, ID. He earned a B.S. degree in forest management from Iowa State University in 1957, an M.S. degree in wildlife management from Colorado State University in 1959, and a Ph.D. degree in range ecosystems from Colorado State University in 1976. His research has included studies in mule deer ecology, big-game range improvement, mule deer population modeling, and nongame bird and small mammal ecology and habitat management.

WARREN P. CLARY is project leader of the Intermountain Station's Riparian-Stream Ecology and Management research work unit at Boise, ID. He received a B.S. degree in agriculture from the University of Nebraska and an M.S. degree in range management and a Ph.D. degree in botany (plant ecology) from Colorado State University. He joined the Forest Service in 1960 and has conducted research on forested and nonforested rangelands in Arizona, Louisiana, Utah, Idaho, Oregon, and Nevada.

ACKNOWLEDGMENTS

We gratefully acknowledge the field or office assistance of John W. Kinney, Kathryn W. Byrd, and Patrick V. Turner. Gene Weller and John A. Phillips provided unpublished information about the study location and grazing history.

RESEARCH SUMMARY

Breeding bird populations and bird community organization were compared between an aspen (*Populus tremuloides*)/willow (*Salix* spp.) riparian habitat seasonally grazed by cattle and a comparable adjacent habitat protected from grazing for the previous 11 years by an exclosure. The exclosure, constructed in 1977, is on the West Fork of Deer Creek in northeastern Nevada. Bird populations were assessed by spot-mapping in the spring of 1988. We were unable to demonstrate differences between the grazed and ungrazed habitats in total bird density, species richness, species composition, or other attributes of the breeding bird communities. Nor were we able to show any pronounced difference between the grazed and ungrazed sites in total density or total standing crop biomass of a nine-species guild of riparian birds that foraged or nested in the ground, shrub, or small-tree layers of vegetation. There were no obvious relationships between the responses of individual bird species and any structural (physiognomic) differences in the vegetation of the grazed and ungrazed habitats.

Intermountain Research Station
324 25th Street
Ogden, UT 84401

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INTRODUCTION

Reports emphasizing the importance of riparian ecosystems as habitat for wildlife are numerous (for example, Ohmart and Anderson 1986; Thomas and others 1979). Many species are either directly dependent on riparian habitats or utilize them more than other habitats. For many of the same reasons that riparian areas are disproportionately important to wildlife, they are also important to livestock. Cattle prefer riparian areas for the quality and variety of forage, for their easy accessibility, for shade, and for a generally reliable source of water (Gillen and others 1985). Because of these converging values, riparian ecosystems represent major areas of potential conflict.

Exclosures, natural areas, and other areas that have received minimal use by livestock are often used as reference areas on rangelands (Laycock 1975). Livestock exclosures provide opportunities to study vegetation and associated wildlife communities on comparable grazed and ungrazed habitats (for example, Bock and others 1984). We compared breeding bird populations and community organization between an area grazed by cattle and a comparable adjacent area protected from grazing for the previous 11 years by a large (>40 ha) fenced exclosure. The exclosure, constructed in 1977, is on the West Fork of Deer Creek in northeastern Nevada.

STUDY AREA

The Deer Creek study site is 55 km north of Wells in Elko County, NV, at an elevation of about 1,890 m. The small stream originates from springs and flows in a narrow, V-shaped canyon cut into mid-Tertiary rhyolitic rock. Average gradient of the canyon bottom is 2 to 3 percent (Platts and others 1988). The riparian areas seldom exceed 25 to 50 m in width. Average annual precipitation at Wells (elevation 1,722 m) is 26.6 cm, with peaks in May and November. Mean annual snowfall is 142 cm (U.S. Department of Commerce 1970).

The stream is closely bordered by clumped communities of aspen (*Populus tremuloides*), willow (*Salix* spp.), and other deciduous shrubs including golden currant (*Ribes aureum*), Woods rose (*Rosa woodsii*), and snowberry (*Symphoricarpos* spp.). Slender wheatgrass (*Agropyron trachycaulum*), Kentucky bluegrass (*Poa pratensis*), Baltic rush (*Juncus balticus*), field horsetail (*Equisetum arvense*), and common dandelion (*Taraxacum officinale*) are common grasses and forbs. The gallery-like riparian area is isolated from similar arboreal vegetation by a surrounding mosaic of upland shrub habitats dominated by big sagebrush (*Artemisia tridentata*), but also including rubber rabbitbrush (*Chrysothamnus nauseosus*) and antelope bitterbrush (*Purshia tridentata*). Other common upland species are bluebunch wheatgrass (*Agropyron spicatum*), Sandberg bluegrass (*Poa secunda*), cheatgrass (*Bromus tectorum*), arrowleaf balsamroot (*Balsamorhiza sagittata*), and Indian paintbrush (*Castilleja* spp.).

Narrow floodplains with dead and downed aspen are common in the study area. These remnants of aspen communities were once flooded by beaver impoundments that killed the aspen. Although washed out dams are still evident, there is no current evidence of beaver activity.

The study site, located on public lands and administered by the Bureau of Land Managment, U.S. Department of the Interior, is grazed from about mid-August to mid-November. Because of weather conditions, the area was grazed from mid-July to mid-October in the year of study (Phillips and Marteney 1989). Construction of the exclosure across the narrow Deer Creek canyon apparently served as a drift fence reducing cattle utilization of the grazed portion of the study area as compared to recent historical use. Thus, it appears that grazing stress has been moderated over the last 11 years on the grazed part of the study area.

METHODS

The rectangular cattle exclosure, about 965 m long and of variable width, is oriented lengthwise along the West Fork. Two 9-ha plots, one in the upper section of the exclosure and the other in the adjacent (upstream) grazed area, were censused for

breeding birds using the spot-map method (International Bird Census Committee 1970). We chose plot locations that best represented the grazed and ungrazed environments. The gridded census plots, 600 by 150 m, were oriented lengthwise along the creek and straddled the stream channel on both the grazed and ungrazed sites. Grid points were surveyed and marked with numbered stakes at 25-m intervals.

One observer (DEM) made 13 census visits to each plot from May 18 to June 16, 1988. Most of the spot-mapping was done from sunrise to early afternoon when birds were most active. To ensure complete coverage, he censused a plot by walking within 25 m of all points on the grid. Census routes were varied. Recorded bird observations extended a minimum of 50 m beyond grid boundaries.

At the end of the sampling period, clusters of observations and coded activity patterns on species maps were circled as indicating areas of activity or approximate territories. Fractional parts of boundary territories were included. Oelke (1981) summarized methodological difficulties and other special problems of the mapping method. We followed Hill (1973) for estimates of bird species diversity.

We measured vegetation and other features of the grazed and ungrazed plots from August 15 to September 2, 1988. Twelve sample locations were systematically established in each of six major vegetation community types (Platts and others 1988) on both the grazed and ungrazed areas for a total sample size of 72 for each plot. We positioned a 50- by 50-cm (0.25-m^2) quadrat at each sample location. Canopy cover (Daubenmire 1959) was ocularly estimated for the total of each plant life form (graminoid, forb, shrub). Percentages of litter, rock, bare ground, and lichen-moss were similarly estimated. We measured the vegetative height (excluding flower and seedhead heights) of each graminoid, forb, and shrub nearest the center of each quadrat.

We determined biomass of graminoids, forbs, and small shrubs by clipping vegetation from ground level upward within a vertical projection from the 0.25-m^2 quadrats. Clipped materials were bagged, ovendried, and weighed. A 3- by 3-m (9-m^2) quadrat, concentric to each 0.25-m^2 quadrat, was used to sample biomass of large shrubs. Basal diameter, maximum height, and species were recorded for each shrub stem rooted within the quadrat. Biomass of large shrubs was estimated by using the equations of Brown (1976). Height and diameter at breast height (d.b.h.) were recorded for each tree stem rooted within 10- by 10-m (100-m^2) quadrats that were concentric to each 0.25-m^2 quadrat.

Plant names follow Holmgren and Reveal (1966). Bird nomenclature is from the 1983 AOU check-list (American Ornithologists' Union 1983).

RESULTS AND DISCUSSION

There were few structural (physiognomic) differences in vegetation between the grazed and ungrazed areas on Deer Creek (table 1). The most evident difference was in the herbaceous layer where graminoid biomass and graminoid and forb height values were reduced on the grazed site. Graminoid biomass on the

Table 1—Vegetation and other features of grazed and ungrazed study plots, Deer Creek, NV, 1988

Item	Ungrazed		Grazed		Probability[2]
	$\bar{x}$[1]	SD	$\bar{x}$[1]	SD	
Graminoid					
Biomass (g/m^2)	172.4	127.2	90.3	69.6	<0.01
Canopy cover (%)	50.5	21.7	49.4	22.6	.76
Height (m)	.36	.14	.24	.20	<.01
Forb					
Biomass (g/m^2)	15.1	16.4	14.2	14.6	.71
Canopy cover (%)	7.1	8.8	6.8	9.2	.84
Height (m)	.16	.12	.12	.12	.06
Shrub					
Biomass (g/m^2)	1,712	9,774	1,355	3,388	.77
Canopy cover (%)	6.7	13.3	6.9	13.2	.92
Height (m)	1.23	1.05	1.35	1.19	.54
Tree					
Density (*n*/ha)	1,093	1,502	1,025	2,022	.81
Height (m)	5.9	3.3	6.8	5.4	.23
Diameter (cm)	6.5	3.9	7.7	7.7	.24
Other					
Bare ground (%)	10.4	18.5	11.6	14.6	.66
Litter (%)	26.1	19.3	23.1	17.4	.32
Rock (%)	5.4	14.6	8.1	18.4	.33
Lichen-moss (%)	.1	.9	<.1	.4	.60

[1]$n = 72$.
[2]Probability associated with unpaired *t*-tests. Small probabilities suggest a significant difference between grazed and ungrazed areas.

grazed plot was only about half that inside the exclosure. Shrub biomass, mostly willows, was not significantly different on the grazed and ungrazed sites. Graminoid, forb, and shrub canopy coverage measurements were similar on the grazed and ungrazed areas. The standard deviation (SD) of the shrub biomass component was much larger on the ungrazed area, suggesting more structural variability in that factor on the ungrazed plot.

We found little difference in tree vegetation between grazed and ungrazed plots, and the number of trees was similar on both plots (table 1). A single stand of large aspen trees on the grazed area tended to inflate average values of tree diameter and height on the grazed plot. Aspen was the only tree species found on the study area. Other features of the two areas, including estimates of bare ground, rock, and litter coverage, were similar.

We recorded 23 species of birds breeding on the Deer Creek study area; 21 species bred on the grazed plot and 22 on the ungrazed plot (table 2). Wide-ranging raptors, although commonly seen, were not included in the analysis. Many transient species were also excluded. On the basis of our observations of habitat use, we classified birds into an upland category (five species) and a riparian category (18 species). The categories are not exclusive. In varying degrees, many of the species listed used both the riparian habitat and the adjacent upland habitat.

No clear differences were apparent between grazed and ungrazed plots with respect to either the number of breeding bird species or total breeding bird densities (table 2). There was a slight tendency for the ungrazed upland area to support more bird pairs, but the difference was not marked. The total number of breeding pairs on the two riparian habitats was virtually identical. Estimates of bird standing crop biomass between the grazed and ungrazed plots were also nearly the same. There was almost complete overlap in the species breeding on the two sites. The vesper sparrow was observed as a breeding bird only on the grazed area; MacGillivray's warbler and the American kestrel were found only on the ungrazed area. (Scientific names of birds are in table 2.)

The most abundant species, each making up more than 5 percent of the breeding bird community, were the *Empidonax* flycatcher, green-tailed towhee, American robin, house wren, yellow warbler, broad-tailed hummingbird, rock wren, and white-crowned sparrow. Those eight taxa accounted for about 75 percent of the breeding birds on both the grazed and ungrazed sites. Two of the most common species, the green-tailed towhee and rock wren, were upland birds.

Our estimate of bird species diversity (the reciprocal of Simpson's Index) was slightly higher on the grazed plot when compared to the ungrazed plot (table 2). But no appreciable difference was evident in either species diversity or species richness between the grazed and ungrazed habitats. Relative abundance curves (James and Rathbun 1981) were used to depict the relative distribution (evenness) of the bird species as an additional characterization of the breeding bird communities on the two areas (fig. 1). The purpose of the curves is to examine relative abundances independently of species richness or density (James and Rathbun 1981). The sameness of the curve shapes suggests a similarity in the distribution of species abundances on the grazed and ungrazed plots. Further, the general steepness of the two curves suggests an intermediate level of species evenness in these habitats. A community having equal numbers of all the bird species present would be represented by a horizontal line.

To further examine differences in bird populations between grazed and ungrazed habitats, we compared nine species of riparian birds that were associated with the ground, shrub, or small-tree layers of vegetation (after Sedgwick and Knopf 1987). They included the broad-tailed hummingbird, *Empidonax* flycatcher, house wren, American robin, warbling vireo, yellow warbler, MacGillivray's warbler, song sparrow, and white-crowned sparrow (table 3). All either foraged or nested in the lower vegetational strata (table 2). Those nine species would seem to be the most responsive to the removal or trampling of riparian vegetation by grazing livestock. The northern flicker, European starling, and Cassin's finch—other potential candidates for inclusion in this guild—were rejected because they consistently foraged in the adjacent upland.

Density and biomass totals for the nine-species guild were similar between the grazed and ungrazed plots (table 3). Densities of individual members of the guild, however, varied markedly between the two habitats. Three species—*Empidonax* flycatcher, warbling vireo, and MacGillivray's warbler—had higher densities on the ungrazed plot. Two species—house wren and song sparrow—were more numerous on the grazed area. Other species, including the broad-tailed hummingbird, American robin, yellow warbler, and white-crowned sparrow, had about the same densities in both habitats. Clearly, the responses of individual members of the guild were inconsistent. Our results in this regard, like those reported by Szaro (1986), suggest little relationship between the guild as a whole and the apparent responses exhibited by individual bird species. Further, we were unable to identify any obvious

Table 2—Density (pairs per 40 ha), diversity, and other attributes of breeding bird populations on grazed and ungrazed study plots, Deer Creek, NV, 1988

Species	Foraging guild[1]	Nesting guild[2]	Density	
			Ungrazed	Grazed
Upland				
Mourning dove (*Zenaida macroura*)	GGG	GRN	0.9	1.3
Rock wren (*Salpinctes obsoletus*)	GGI	CRN	13.8	10.2
Green-tailed towhee (*Pipilo chlorurus*)	GGO	BTN	24.4	19.1
Brewer's sparrow (*Spizella breweri*)	GGI	BTN	4.4	4.4
Vesper sparrow (*Pooecetes gramineus*)	GGO	GRN	0	1.8
Subtotal			43.5	36.8
Riparian				
American kestrel (*Falco sparverius*)	GFC	SCN	2.7	0
Broad-tailed hummingbird (*Selasphorus platycercus*)	FNI	BTN	12.9	15.6
Lewis' woodpecker (*Melanerpes lewis*)	ASI	PCN	1.8	2.2
Yellow-bellied sapsucker (*Sphyrapicus varius*)	TDO	PCN	2.7	2.7
Downy woodpecker (*Picoides pubescens*)	TDI	PCN	3.6	.9
Northern flicker (*Colaptes auratus*)	GGI	PCN	3.6	4.0
Empidonax flycatcher[3] (*Empidonax* sp.)	ASI	BTN	45.3	33.8
Tree swallow (*Tachycineta bicolor*)	AFI	SCN	1.8	2.7
House wren (*Troglodytes aedon*)	FGI	SCN	11.1	23.6
American robin (*Turdus migratorius*)	GGI	BTN	19.6	16.0
European starling (*Sturnus vulgaris*)	GGO	SCN	.4	7.6
Warbling vireo (*Vireo gilvus*)	FGI	BTN	8.9	2.7
Yellow warbler (*Dendroica petechia*)	FGI	BTN	16.0	16.4
MacGillivray's warbler (*Oporornis tolmiei*)	FGI	BTN	4.4	0
Song sparrow (*Melospiza melodia*)	GGO	GRN	5.3	10.7
White-crowned sparrow (*Zonotrichia leucophrys*)	GGO	BTN	9.3	11.6
Northern oriole (*Icterus galbula*)	FGI	DTN	5.8	5.3
Cassin's finch (*Carpodacus cassinii*)	GGG	CDN	1.8	2.2
Subtotal			157.0	158.0
Total pairs per 40 ha			200.5	194.8
Total individuals per km^2			1,002	974
Biomass[4] (g/ha)			273	275
Species richness (*n*)			22	21
Species diversity ($1/\Sigma p_i^2$)			9.8	11.3

[1]After Diem and Zeveloff (1980). GFC = ground feeding carnivore, GGG = ground gleaning granivore, AFI = aerial feeding insectivore, FNI = foliage nectivore-insectivore, TDO = timber drilling omnivore, TDI = timber drilling insectivore, GGI = ground gleaning insectivore, ASI = aerial sally feeding insectivore, GGO = ground gleaning omnivore, FGI = foliage gleaning insectivore.

[2]After Diem and Zeveloff (1980). CRN = cliff, cave, rock, or talus nester, CDN = conifer-deciduous tree nester, SCN = secondary cavity nester, GRN = ground nester, BTN = bush and small tree nester, PCN = primary cavity nester, DTN = deciduous tree nester.

[3]Specific identification of the *Empidonax* flycatcher was not confirmed; most appeared to be the dusky flycatcher (*Empidonax oberholseri*).

[4]Species weights from Dunning (1984).

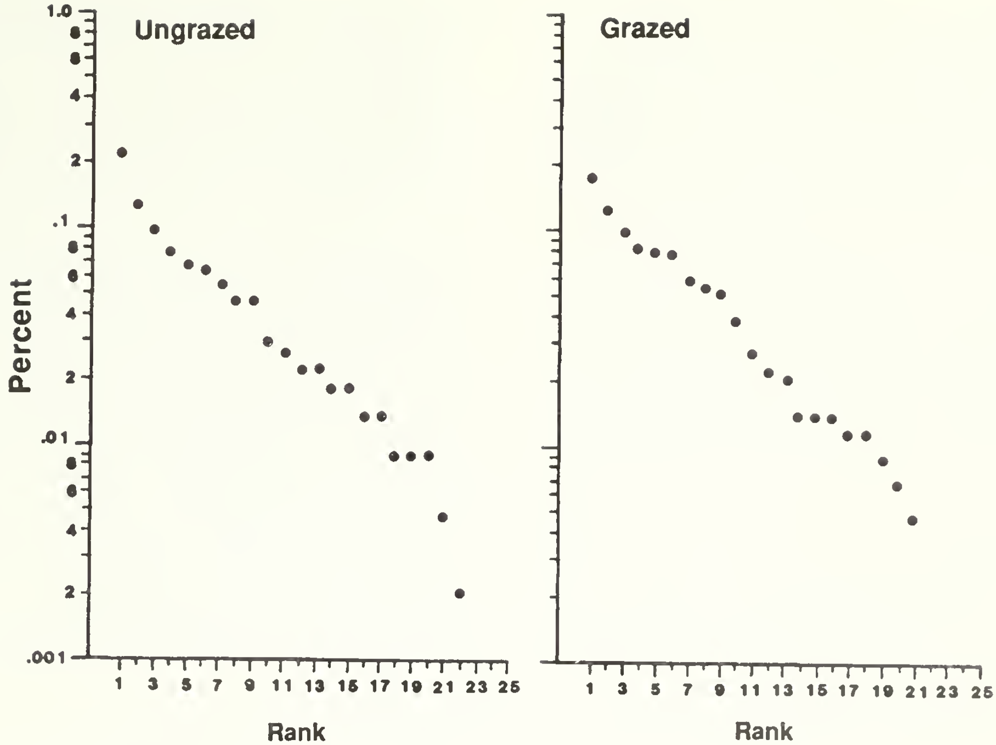

Figure 1—Bird relative abundance curves for grazed and ungrazed habitats, Deer Creek, NV, 1988. The ordinate is the percentage of total individuals plotted on a logarithmic scale, and the abscissa is the rank from the most common to the least common species.

Table 3—Density (pairs per 40 ha) of riparian birds associated with ground, shrub, and small-tree layers of vegetation on grazed and ungrazed study plots, Deer Creek, NV, 1988

Species	Density	
	Ungrazed	Grazed
Broad-tailed hummingbird	12.9	15.6
Empidonax flycatcher	45.3	33.8
House wren	11.1	23.6
American robin	19.6	16.0
Warbling vireo	8.9	2.7
Yellow warbler	16.0	16.4
MacGillivray's warbler	4.4	0
Song sparrow	5.3	10.7
White-crowned sparrow	9.3	11.6
Total pairs per 40 ha	132.8	130.4
Total individuals per km^2	664	652
Biomass (g/ha)	142	132

relationships between responses of individual species and our measures of habitat structure (primarily vegetational) on the grazed and ungrazed plots. Without more convincing evidence, we are reluctant to attribute the differing species' responses on the grazed and ungrazed areas to any structural differences in the habitat that may have resulted from the grazing treatments.

Others have reported minimal effects of livestock grazing on riparian bird communities. Mosconi and Hutto (1982) found similar total breeding bird densities between heavily grazed and lightly grazed riparian habitats in western Montana. There were, however, significant compositional differences in the bird communities. Eight species were recorded only on the lightly grazed site while 12 species were recorded only on the heavily grazed site. Similarly, Kauffman and others (1982) found little difference in total avian densities between grazed and ungrazed

plots in a foothill riparian zone in northeastern Oregon. Late-season grazing had few short-term impacts on bird populations, particularly during the nesting/brooding season, which preceded the grazing period. The grazed communities were preferred by birds of insect foraging guilds; ungrazed communities were preferred by birds of herbivorous/granivorous foraging guilds. Sedgwick and Knopf (1987) were unable to detect any impact of moderate, late-fall grazing on breeding densities of selected migratory birds in a plains cottonwood (*Populus sargentii*) bottomland in northeastern Colorado. Analysis was focused on bird species directly dependent on the grass-forb-shrub layer of vegetation for foraging or nesting.

CONCLUSIONS

We were unable to demonstrate any clearly marked differences in total breeding bird densities or bird community attributes between grazed and ungrazed riparian habitats on the West Fork of Deer Creek in northeastern Nevada. Bird community composition, bird species diversity and evenness, bird species richness, and estimates of bird standing crop biomass were similar between a habitat that was seasonally grazed by cattle and an adjacent habitat that had been protected from grazing for the previous 11 years. Nor were we able to show any pronounced difference between the grazed and ungrazed sites in either total density or total standing crop biomass of a nine-species guild of riparian birds that foraged or nested in the ground, shrub, and small-tree layers of vegetation. Densities of individual members of that guild, however, varied substantially between the grazed and ungrazed habitats. There were no obvious relationships between single-species responses and any structural (primarily vegetational) differences in the grazed and ungrazed habitats that may have resulted from the grazing treatments.

REFERENCES

American Ornithologists' Union. 1983. Check-list of North American birds. 6th ed. Washington, DC: American Ornithologists' Union. 877 p.

Bock, Carl E.; Bock, Jane H.; Kenney, William R.; Hawthorne, Vernon M. 1984. Responses of birds, rodents, and vegetation to livestock exclosure in a semidesert grassland site. Journal of Range Management. 37(3): 239-242.

Brown, James K. 1976. Estimating shrub biomass from basal stem diameters. Canadian Journal of Forest Research. 6(2): 153-158.

Daubenmire, R. 1959. A canopy-coverage method of vegetational analysis. Northwest Science. 33(1): 43-64.

Diem, Kenneth L.; Zeveloff, Samuel I. 1980. Ponderosa pine bird communities. In: DeGraff, Richard M., tech. coord. Proceedings of the workshop on management of Western forests and grasslands for nongame birds; 1980 February 11-14; Salt Lake City, UT. Gen. Tech. Rep. INT-86. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station: 170-197.

Dunning, John B., Jr. 1984. Body weights of 686 species of North American birds. Monogr. 1. Tucson, AZ: Western Bird Banding Association. 38 p.

Gillen, R. L.; Krueger, W. C.; Miller, R. F. 1985. Cattle use of riparian meadows in the Blue Mountains of northeastern Oregon. Journal of Range Management. 38(3): 205-209.

Hill, M. O. 1973. Diversity and evenness: a unifying notation and its consequences. Ecology. 54(2): 427-432.

Holmgren, Arthur H.; Reveal, James L. 1966. Checklist of the vascular plants of the Intermountain Region. Res. Pap. INT-32. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 160 p.

International Bird Census Committee. 1970. An international standard for a mapping method in bird census work. Audubon Field Notes. 24(6): 722-726.

James, Frances C.; Rathbun, Stephen. 1981. Rarefaction, relative abundance, and diversity of avian communities. Auk. 98: 785-800.

Kauffman, J. Boone; Krueger, William C.; Vavra, Martin. 1982. Impacts of a late season grazing scheme on nongame wildlife in a Wallowa Mountain riparian ecosystem. In: Peek, J. M.; Dalke, P. D., eds. Proceedings of the wildlife-livestock relationships symposium; 1981 April 20-22; Coeur d'Alene, ID. Moscow, ID: University of Idaho, Forest, Wildlife and Range Experiment Station: 208-220.

Laycock, W. A. 1975. Rangeland reference areas. Range Science Series 3. Denver, CO: Society for Range Management. 66 p.

Mosconi, Sandra L.; Hutto, Richard L. 1982. The effect of grazing on the land birds of a western Montana riparian habitat. In: Peek, J. M.; Dalke, P. D., eds. Proceedings of the wildlife-livestock relationships symposium; 1981 April 20-22; Coeur d'Alene, ID. Moscow, ID: University of Idaho, Forest, Wildlife and Range Experiment Station: 221-233.

Oelke, Hans. 1981. Limitations of the mapping method. In: Ralph, C. John; Scott, J. Michael, eds. Estimating numbers of terrestrial birds: Proceedings, international symposium; 1980 October 26-31; Asilomar, CA. Studies in Avian Biology 6. Ithaca, NY: Cooper Ornithological Society: 114-118.

Ohmart, Robert D.; Anderson, Bertin W. 1986. Riparian habitat. In: Cooperrider, Allen Y.; Boyd, Raymond J.; Stuart, Hanson R., eds. Inventory and monitoring of wildlife habitat. Denver, CO: U.S. Department of the Interior, Bureau of Land Management, Service Center: 169-199.

Phillips, John A.; Marteney, Shawna. 1989. [Letter to Warren P. Clary]. February 22. 2 leaves. On file at: U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Forestry Sciences Laboratory, Boise, ID; RWU 4202 files.

Platts, William; Jensen, Sherman; Smith, Frank. 1988. Preliminary classification and inventory of riverine riparian habitats: livestock/fishery study areas, Nevada. Prog. Rep. I. Smithfield, UT: White Horse Associates. 77 p.

Sedgwick, James A.; Knopf, Fritz, L. 1987. Breeding bird response to cattle grazing of a cottonwood bottomland. Journal of Wildlife Management. 51(1): 230-237.

Szaro, Robert C. 1986. Guild management: an evaluation of avian guilds as a prediction tool. Environmental Management. 10(5): 681-688.

Thomas, Jack Ward; Maser, Chris; Rodiek, Jon E. 1979. Wildlife habitats in managed rangelands—the Great Basin of southeastern Oregon: riparian zones. Gen. Tech. Rep. PNW-80. Portland, OR: U.S. Department of Agriculture, Pacific Northwest Forest and Range Experiment Station. 18 p.

U.S. Department of Commerce. 1970. Climatological summary, 1939-1968. Environmental Services Administration in cooperation with the University of Nevada, Reno.

Medin, Dean E.; Clary, Warren P. 1991. Breeding bird populations in a grazed and ungrazed riparian habitat in Nevada. Res. Pap. INT-441. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 7 p.

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KEYWORDS: density, diversity, biomass, guilds, *Populus tremuloides, Salix* spp.

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U.S. GOVERNMENT PRINTING OFFICE 1991/573-041/21024